SURFACING COMPOSITION CONTAINING AQUEOUS RESIN EMULSION AND CALCIUM SULFATE HEMIHYDRATE PLASTER

This application is a continuation-in-part of application Ser. No. 153,793, filed on June 16, 1971, now abandoned.

The invention relates to plaster compositions and in its preferred forms provides surfacing compositions capable of giving a self-smoothing, flexible, non-shrink, water, oil and grease resistant flooring surface.

One of the difficulties encountered with plaster compositions is that a substantial excess of water weakens the final product by leaving voids but, on the other hand, is necessary to provide a fluid composition which will flow to give a smooth flat surface when applied to a substantially horizontal substrate. We have now found that the use of a resin emulsion in admixture with the plaster solids has a surprising effect on the flow properties of the resulting composition and that the amount of water can be substantially reduced to give a composition with the desirable flow properties which sets to a strong solid material. Much improved self-levelling and self-smoothing properties are in fact obtainable as compositions according to the invention with relatively low water contents will flow and level under their own weight.

According to the invention there is provided a fluid plaster composition comprising a calcium sulphate alpha-hemihydrate plaster and an aqueous resin emulsion, the relative proportions of the plaster and the resin emulsion being such that the plaster takes up the major part of the water in the emulsion when it sets. The term "emulsion" is used in this specification in the technical sense rather than in the true scientific sense as the resin will normally be a solid and not a liquid at the temperatures in question.

The resin content of the composition imparts substantial wear and water resistance to the set plaster and permits it to be used as a flooring material.

The composition would normally be supplied to the user as a two-pack system and when mixed together controllable working and setting times can be achieved of approximately 15 minutes to 4 hours.

The composition thus comprises gypsum plaster and an aqueous emulsion of polymer resin or the like and may also contain, to achieve varying rheological properties to meet different conditions of applications, plasticizers, solvents, calciferous mineral powders, siliceous aggregates, defoamers, rubber crumb, cork granules, asbestos fibre, pigment powder and/or pastes and the like. The composition may be applied in a number of ways, e.g. simply pouring from a vessel, by spray gun in conjunction with pressurised containers or by power operated liquid transference pumps. The composition can be pigmented to most colours; by applying simultaneously two different colours using a special spray gun, two-tone mottle effects can also be achieved; by making different to each other the viscosity of the simultaneously applied coloured compositions or by differing the setting time of the two coloured compositions, one colour from the other, raised patterns can be achieved.

The preferred compositions are ideally suited for domestic and light industrial flooring and, when used in conjunction with suitable aggregates, heavy industrial floorings, as water-resistant toppings for open balcony walkways, decks of multi-story car parks, surfacing material over asphalt or in place of asphalt for concrete and other roofs. Also due to the controllable rapid setting properties of the compositions they are ideally suited for road and aircraft runway markings and for road antiskid areas when the compositions are used in conjunction with iron silicates, calcined flint, carborundum, flint or calcined bauxite etc. The compositions can be used for the surfacing of ship decks and can also be used as a factory applied decorative and protective facing material for plywood, chipboard, hardboard, plasterboard, concrete, asbestos sheet etc.

The polymer resins useful in this invention are usually polymers of ethylenically unsaturated monomers and include vinyl resins and polymers of acrylates and methacrylates, particularly alkyl esters of acrylic and methacrylic acids in which the alkyl group has up to twelve carbon atoms. Examples include methyl acrylate, butyl acrylate, ethyl acrylate, methyl methacrylate, ethyl methacrylate, butyl methacrylate, hexyl methacrylate and lauryl methacrylate. Other resin emulsions include polyvinylacetate emulsions and polystyrene emulsions. Copolymers of two or more of the three classes of monomer (acrylate and methacrylate; vinyl acetate; styrene) can be used as desired depending on the properties required in the final product. For example, polystyrene is alkali-resistant and water-resistant but its long-term aging properties are not good. Polyvinylacetate has low water-resistance but in certain applications, e.g. when the composition is applied to a tar or bitumen base, this is not important. The acrylate and methacrylate resins have good long term aging properties and good water and alkali resistance but they do not have good flow properties and they are more expensive than polyvinylacetate and polystyrene. Styrene/acrylate copolymers are preferred and one suitable copolymer is a copolymer of acrylate and styrene in a weight ratio of 1:1. Polyvinyl chloride, vinylidene and other vinyl resins can also be used. Natural latexes are also envisaged. The term "copolymer" as used herein is intended to include polymer blends as well as true copolymers.

It is desirable, though not essential, for the resin to form a continuous film or matrix on setting as this improves strength and water resistance. For this purpose, the very hard resins, such as polystyrene are desirably blended with softer resins or plasticizers, or a softer comonomer is incorporated therein.

The resins in the compositions of this invention desirably set to a resin phase which is hard at room temperature (65°F) although some softening is permissible at higher temperatures as explained below. It is difficult to quantify hardness but a convenient test is to run a finger nail along the surface of the resin. Desirably the resin should be sufficiently hard to prevent a groove being formed using this test.

The emulsions normally contain about 50% resin solids but a wide variation e.g. 35% to 60% particularly 50 – 56% is possible, the particle size desirably being 0.1 to 1.5 microns.

For details of resin emulsion formulation, reference is directed to "The Fundamental Principles of Polymerisation" by D'Alelio published by Wiley in 1952 and "Principles of Polymer Chemistry" by R.J. Flory published by Cornell University Press in 1969.

It is believed that the surfactants used to prepare the emulsions play an important part in the improvement of the fluid plaster composition and it is postulated that some surfactant is adsorbed in the plaster particles. It